CLAIMS

1. A fluidic device (1) produced from one or more components, for example from a support (12) comprising:
   - an operative cavity (3),
   - at least two ducts (41, 42), for example an inlet duct (41) and an outlet duct (42) for a liquid of interest, which communicate with the operative cavity (3), respectively by means of two valve bodies (51, 52) with no moving parts, of the type, for controlling the operative cavity,
   - two trapping chambers (81, 82) for a gas, for example air, which communicate only and respectively with the two ducts (41) and (42), by means of two distinct channels (91, 92) for connecting, respectively, said two ducts,
   - means for heat exchange with one and/or the other trapping chamber (81, 82), in order to control the pressure of the gas in one and/or the other trapping chamber.

2. The device as claimed in claim 1, characterized in that each body (51, 52) with no moving parts is a capillary valve.

3. The device as claimed in claim 1 or 2, characterized in that each capillary valve is constructed so as to generate an overpressure at the interface between the gas and the liquid of interest, referred to as a meniscus, that opposes any displacement of the liquid beyond the valve, against the overpressure.

4. The device as claimed in any one of claims 1 to 3, characterized in that each capillary valve (71, 72, 51, 52, 101, 102) comprises a base, the cross section of which increases in the direction of the

concavity of said meniscus when the liquid of interest is wetting, or the cross section of which decreases in the direction of said concavity when said liquid of interest is not wetting.

5. The device as claimed in any one of claims 1 to 4, characterized in that it comprises two isolating means (201, 202), placed, respectively, on the two ducts (41, 42), each constructed to take up two positions, namely an open position which establishes communication from one said duct with the outside, and a closed position which isolates said duct from the outside.

6. The device as claimed in any one of claims 1 to 5, characterized in that it comprises two expansion chambers (61, 62), each one placed between said operative cavity (3) and each duct (41, 42), each chamber communicating, on one side, with said duct by means of a first capillary valve (71, 72) with no moving parts, that opposes any flow of liquid to said chamber and, on the other side, with said cavity by means of a second capillary valve (51, 52) that opposes any flow of liquid to said chamber.

7. The device as claimed in claim 6, characterized in that the two connecting channels (91, 92) each connect a trapping chamber (81, 82) with an expansion chamber (61, 62).

8. The device as claimed in claim 6 or 7, characterized in that each connecting channel (91, 92) communicates with the corresponding expansion chamber (61, 62) by means of a capillary valve (101, 102) with no moving parts, that opposes any flow of liquid to said trapping chamber (81) or (82).

9. The device as claimed in any one of claims 6 to 8, characterized in that the two expansion chambers (61, 62) are substantially identical, in particular in volume.

10. The device as claimed in any one of claims 1 to 9, characterized in that the two trapping chambers (81, 82) are substantially identical, in particular in volume.

11. The device as claimed in claim 1, characterized in that it comprises an incubation chamber (305), the outlet (306) of which communicates with the inlet duct (41), and the operative cavity (3) comprises, in the form of particles (303), a support (M_2) functionalized with a ligand (L_3).

12. The device as claimed in claim 1, characterized in that a means (307) for oriented dissociation, for example a heating means, is placed in contact with the inlet duct (41).

13. The device as claimed in claim 12, characterized in that a means (308) for retaining particles, for example magnetic particles, is placed in contact with the inlet duct (41), downstream with respect to the means (307) for oriented dissociation.

14. The use of the fluidic device (1) as claimed in any one of claims 6 to 9, for isolating or confining all or part of a liquid of interest in the operative cavity (3), characterized in that:

a) the operative cavity (3) and the expansion chambers (61, 62) are filled, beforehand, by circulating the liquid of interest from an inlet duct (41) to the other, outlet duct (42), retaining a residual gas, for example air, in the two trapping chambers (81, 82),

b) after circulation of the liquid of

interest, the residual gas in the two trapping chambers is brought to an "isolating" temperature, so as to bring the pressure in said trapping chambers to an "equilibrium pressure" value that is sufficient to evacuate all or part of the liquid of interest from the two expansion chambers (61, 62) by means of at least one of the two ducts (41, 42), and to fill all or part of said chambers with two bubbles of the residual gas, isolating the operative cavity with respect to any leakage of the liquid of interest and/or to any diffusion of the particles contained in said liquid of interest to said ducts (41, 42).

15. The use of the fluidic device (1) as claimed in any one of claims 6 to 9, for isolating or confining and agitating all or part of a liquid of interest in the operative cavity (3), characterized in that:

a) the operative cavity (3) and the expansion chambers (61, 62) are filled, beforehand, by circulating the liquid of interest from an inlet duct (41) to the other, outlet duct (42), retaining a residual gas, for example air, in the two trapping chambers (81, 82),

b) after circulation of the liquid of interest, the residual gas in the two trapping chambers is brought to an "isolating" temperature, so as to bring the pressure in said trapping chambers to an "equilibrium pressure" value that is sufficient to evacuate all or part of the liquid of interest from the two expansion chambers (61, 62) by means of at least one of the two ducts (41, 42), and to fill all or part of said chambers with two bubbles of the residual gas, isolating the operative cavity with respect to any leakage of the liquid of interest and/or to any diffusion of the particles contained in said liquid of interest to said ducts (41, 42),

c) the temperature of the residual gas present in at least one of the trapping chambers (81, 82) is modified in order to modify its pressure and to displace the liquid of interest toward one of the expansion chambers (61, 62), without breaking the isolation of the operative cavity (3),

d) the temperature of the residual gas present in at least one of the trapping chambers (81, 82) is again modified in order to again modify its pressure and to displace the liquid of interest toward the other of the expansion chambers (61, 62), without breaking the isolation of the operative cavity (3).

16. The use as claimed in claim 15, characterized in that the pressure obtained in step (d) is the equilibrium pressure.

17. The use as claimed in claim 15, characterized in that steps (c) and (d) are repeated.

18. The use of the fluidic device (1) as claimed in any one of claims 6 to 9, for agitating the content of the operative cavity (3), characterized in that:

a) the operative cavity (3) and the two expansion chambers (61, 62) are filled, beforehand, by circulating the liquid of interest from an inlet duct (41) to the other, outlet duct (42), retaining a residual gas, for example air, in the two trapping chambers (81, 82), at a predetermined "filling" temperature,

b) next, the residual gas in both the trapping chambers (81) and (82) is heated from the filling temperature to a "reference" temperature, but at a "high" value in one (82) that is greater than the "low" value in the other trapping chamber (81), in return for which a discrete quota (20) of

the liquid of interest is formed in the expansion chamber (61) associated with said other trapping chamber (81), compressing the residual gas which is therein, and a bubble of residual gas forms in the expansion chamber (62) associated with the trapping chamber (82),

c) the temperature of the residual gas in the other (81) of the trapping chambers is again increased, in return for which the same quota (20) of the liquid of interest is displaced from the operative cavity (3) to the expansion chamber (62) associated with said trapping chamber (82), compressing the residual gas which is therein,

d) the temperature of the residual gas in the other (81) of the trapping chambers is returned to the "reference" temperature, at its low value, in return for which the same quota (20) is displaced to the expansion chamber (61) associated with said trapping chamber (81).

19. The use as claimed in claim 18, characterized in that, in step (b), the residual gas in both the trapping chambers (81) and (82) is heated simultaneously or successively.

20. The use as claimed in claim 18, characterized in that operations (c) and (d) are repeated a whole number of times, so as to generate oscillations of the discrete quota (20) through the operative cavity (3).

21. The use as claimed in claim 14, of a device as claimed in claim 10, for carrying out a method, of the ELISA or ELOSA type, for determining a target species, or analyte (C), comprising two sites (C_1, C_2) for ligation, respectively, with a first ligand (L_1) and with a second ligand (L_2), bound directly or indirectly to a label E, said method comprising the following steps:

a) a support (M_1) is provided, functionalized with the first ligand (L_1), placed in an incubation chamber (M_1, L_1),

b) in a liquid medium, in the incubation chamber, the functionalized support (M_1, L_1), the target species (C) or analyte, and the labeled second ligand (L_2, E) are brought into contact, simultaneously or successively, so as to obtain a support/first ligand/target species/labeled second ligand complex (300),

c) another support (M_2) functionalized (303) with a third ligand (L_3), capable of binding to the target species (C), is provided,

d) the complex (300) is dissociated in an oriented manner, so as to separate a conjugate (301) combining the target species/labeled second ligand, from the functionalized (M_1, L_1) support (302),

e) in a liquid medium, the other functionalized (M_2, L_3) support (303) is brought into contact with the conjugate (301) so as to obtain another other support/third ligand/target species/
labeled second ligand complex (304),

f) the label (E) of the other complex (304) is qualitatively and/or quantitatively detected.